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# TOXICITY ASSESSMENT UNIT



OFFICE OF CHEMICAL SAFETY



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# Illinois Environmental

On the order of 60,000 individual chemicals are currently produced and used commercially. Each of them, therefore, may be a potential environmental pollutant and possibly an environmental hazard. Regulatory agencies need to be knowledgeable about the specific physical and chemical properties which determine the behavior of an individual compound in the environment, its effects on plants and animals, and the concentrations required to cause such effects. Within the Illinois Environmental Protection Agency (IEPA) this expertise is centralized in the Toxicity Assessment (TAU) of the Office of Chemical Safety. Other IEPA staff consult with this unit whenever specific information on the toxicological effects of a chemical are needed. This brochure describes the activities of and services available through the Toxicity Assessment Unit.

## PURPOSE

Environmental protection activities over the last two decades have been marked by ever increasing technical and scientific sophistication in many areas. The analytical abilities of chemistry laboratories have lowered the detection limits for many chemicals from the parts per million range to the parts per billion, parts per trillion, and in some cases, into the parts per quadrillion range. One part per quadrillion is akin to taking a one second vacation after working 32 million years. Paralleling this increasing capability in the laboratory has been improvement in the technology involved in pollution control. Thus, early efforts to rectify gross pollution problems, such as "dead" lakes and streams, smog alerts, and burning rivers, have evolved into efforts to protect against less obvious environmental hazards involving longterm effects. Meth-



ods used to determine the effects of chemicals on public health, public welfare, and the environment have improved from dilution is the solution to pollution" to the current use of toxicological, pharmacological, physiological, biochemical, biological, physical, chemical, and statistical inputs into the process of regulating toxic chemicals.

## REGULATORY SUPPORT

As the science of detecting and evaluating environmental contaminants becomes more and more refined and exact, the need increases for more sophisticated state programs to regulate chemicals in the environment. The Illinois Environmental Protection Agency is responding to this need through the development of new, or the revision of existing regulatory programs.

In a modern, industrially developed society, it is inevitable that environmental contaminants will be released from industrial processes, consumer end-use activities, and waste disposal. New and revised regulatory programs must recognize differences between chemicals with respect to toxicity and likelihood to reach and affect plants, animals, or humans. The Toxicity Assessment Unit has been an important resource to the authors of regulatory programs in identifying which chemicals to regulate and to what degree. The TAU can provide information regarding each chemical's unique physical and toxicological properties. The TAU has also been instrumental in providing guidance for chemical screening and evaluation methods which can be incorporated into the various state regulatory programs.

## TOXICOLOGY REPORTS

TAU personnel provide document review and comment, project development input, and expert assistance for major IEPA projects. These projects require in-depth review of technical reports related to potential environmental health threats. These include remedial investigations, feasibility studies, endangerment assessments, risk assessments, special use permits for pesticides, and preliminary investigations and health assessments prepared by Illinois Department of Public Health.

## CHEMICAL HEALTH EFFECTS

The Toxicity Assessment Unit is a source of information on toxic chemicals for the private and public sector. In response to information requests, the TAU either provides the necessary information or, if appropriate, directs questions to the proper sources.

The TAU is continually developing and revising a series of Chemical Information Sheets which are summaries of available data regarding the nature and health effects of particular chemicals. These information sheets are distributed to the general public, press, etc. in an effort to communicate general information about particular chemicals. Chemicals covered by Chemical Information Sheets fall into the following categories:

- Volatile Organic Compounds (methylene chloride, vinyl chloride, trichloroethylene, tetrachloroethylene, benzene, toluene, etc.);
- Complex Organic Pollutants (polycyclic aromatic hydrocarbons, polychlori-



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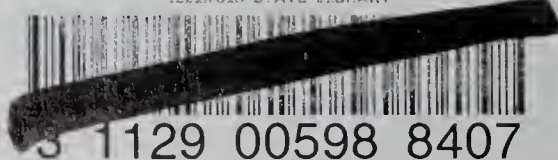
- nated biphenyls, dioxins, furans, etc.);
- Metals (arsenic, cadmium, chromium, lead, etc.); and
- Pesticides (aldrin, chlordane, dieldrin, etc.).

Occasionally TAU must prepare in-depth summaries of chemical, physical, and toxicological data for specific chemicals in response to Agency needs. Such reviews are not distributed to the general public, however.

## TOXICITY IMPACT ASSESSMENTS

The TAU has developed a process for assessing the possibility of adverse effects on public health, public welfare, or the environment due to known or potential releases of toxic substances into the environment. The Toxicity Impact Assessment (TIA) process provides decision-makers with an assessment of the nature and extent of a problem, allowing them to weigh the alternatives and select a course of action based on the best information available at that time. It can be thought of as an expansion of what is more commonly called risk assessment. This assessment process supports a number of IEPA activities, such as permitting, setting of cleanup objectives, setting of standards, and ranking of the potential adverse effects of specific chemicals and/or facilities to prioritize Agency activities. TIA is a means for providing specialized scientific input into control division decision-making activities where more routine inputs may be insufficient.

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## TOXICOLOGY INFORMATION SOURCES

The large number of potentially dangerous chemicals and the potentially large populations exposed to them result in a focus of attention on chemical hazards. Key to the assessment of potential health and environmental risks of chemical substances is obtaining the necessary information about these chemicals. Gathering this information often requires searching many data sources including books, journals, computerized data bases, USEPA documents, data files, etc. OCS has built up a toxicology information center that supports programs and projects within the Agency, and occasionally for other agencies.

Information is available from standard print sources and on-line computer data bases. An example of an on-line data base used by TAU is the Chemical Information System (CIS), which is a collection of computerized data storage and retrieval modules for chemical information. Chemical/physical properties, environmental fate, aquatic data, human toxicity, and regulatory actions are some of the areas covered. The TAU may also access all the data bases available from the National Library of Medicine such as Toxline, Chemline, Medline, and Toxnet.

The TAU may also access IRIS (Integrated Risk Information System). IRIS is a computer-housed, electronically communicated catalogue of USEPA risk assessment and risk management information for chemical substances. This system is designed especially for federal, state, and local environmental and health agencies as a source of the latest information about USEPA health assessments and regulatory positions for specific chemicals.

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